

FIVE-YEAR REVIEW

REPORT

MALLORY CAPACITOR CO.

WAYNESBORO, WAYNE COUNTY, TENNESSEE

TND075453688

JUNE 1998

REGION IV

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DECLARATION FOR THE MALLORY CAPACITOR CO.

FIVE-YEAR REVIEW

SITE NAME AND LOCATION

Mallory Capacitor Co.
Waynesboro, Wayne Co., Tennessee

STATEMENT OF BASIS AND PURPOSE

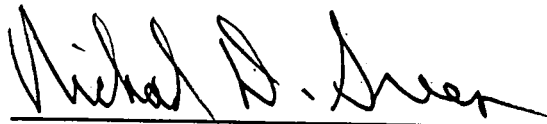
This report has been prepared in accordance with the May 23, 1991, Office of Solid Waste and Emergency Response (OSWER), Directive 9355.7-02 and the July 26, 1994, OSWER Directive 9355.7-02A. The directives state that Regions must conduct a Statutory Review within five years of the initiation of remedial action at a site if that action will result in any hazardous substance remaining at the site. The Five-Year Review is to assure that the remedial action is protective of human health and the environment. The Remedial Action at the Mallory Capacitor Co. Site meets these criteria.

The subject Five-Year Review was originally included with the attached September 24, 1996, Preliminary Close Out Report. The Report was reviewed and approved by EPA Headquarters. There was no objection by EPA Headquarters at that time concerning the inclusion of the Five-Year Review with the Preliminary Close Out Report. However, recent EPA Headquarter concerns have required the Site's Five-Year Review be separated from the Preliminary Close Out Report. The Five-Year Review Report is now a stand alone document.

ASSESSMENT OF THE SITE

The Site has in place an operating groundwater treatment system. The system is subject to modification as conditions warrant. This report (and attached reports) has gone through EPA, Region IV and Headquarters (Preliminary Close Out Report/Five-Year Review only) peer review. This report summarizes EPA's activity at the Site, documents conditions and states why the Site is continued to be protective of human health and the environment. The next Five-Year Review should be completed by June 2003.

Approved by:



Richard D. Green, Director
Waste Management Division

Date:

1 JUL 98

MALLORY CAPACITOR CO.
TND075453688
WAYNESBORO, WAYNE COUNTY, TENNESSEE

FIVE-YEAR REVIEW

I. BACKGROUND

A. INTRODUCTION

This five-year review for the Mallory Capacitor Co. Site is performed in accordance with CERCLA Section 121(c) and pursuant to the requirements of the Office of Solid Waste and Emergency Response (OSWER) Directive 9355.70-2 (*Structure and Components of Five-Year Reviews*, May 23, 1991) and OSWER Directive 9355.7-02A (*Supplemental Five-Year Review Guidance*, July 26, 1994). The directives state that EPA must conduct five-year reviews as a matter of statute at sites where after the completion of the Remedial Action, hazardous substances will remain above levels that allow unlimited use and unrestricted exposure. This is the situation at this Site.

B. SITE LOCATION

The Mallory Capacitor Co. Site is located on Belew Circle, Waynesboro, Wayne County Tennessee, on the western bank of the Green River. This 8.6 acre site is located in a residential/commercial/industrial area which lies on the Green River in the eastern section of Waynesboro. The estimated population of Waynesboro is 1,824 persons and that of Wayne County is 13,935 persons.

There are no wetlands, endangered species or critical habitats that are impacted by the Site. No historical landmarks are being impacted by the Site. No agricultural lands have been impacted by the Site.

The geology of the Site as interpreted from surface and subsurface features consists of three stratigraphic units, namely alluvial deposits, residual soils, and bed rock. All three units are encountered across the Site at varying depths. The alluvial deposits consist of red to brown silts and sands with some clay and gravel and vary in depth from eight feet on the western side of the Site to zero feet where it feathers out at the Green River on the eastern side of the Site. The residual soils with a maximum encountered depth of approximately eight feet, consist of brown to tan mottled clay silts resulting from in-situ weathering. The Fort Payne Formation is the aquifer used for water. The city is mostly served by municipal portable water and sewer systems, with a few private water supplies. Within a 1-mile radius of the Site, 54 private water sources have been identified, consisting of 27 drilled wells, 19 dug wells and 8 springs. The nearest private water source to the Site was identified to be a spring, located approximately 1,200 feet to the west.

C. SITE HISTORY

The potentially Responsible Party (PRP) has completed all construction activities for the Mallory Capacitor Co. Site (the Site) in accordance with *Procedures for Completion and Deletion of National Priorities List Sites* (OSWER Directive 9320.2-09). The PRP is Battery Property, Inc. (BPI), and their consultant is Conestoga-Rovers & Associates (CRA). The United States Environmental Protection Agency (EPA), the Tennessee Department of Environment and Conservation (TDEC) and CRA representatives conducted a Final Construction Inspection of the Long Term Remedial Action (LTRA) on June 26, 1996. This inspection also served as the Five-Year Review Site Visit. A follow up Five-Year Review Site Visit was conducted by EPA, State and PRP representatives on June 4, 1998. EPA determined the PRP has constructed the remedy in accordance with the Remedial Design (RD) plans and specifications. The PRP has initiated activities necessary to achieve performance standards and site completion.

1. OPERATIONAL HISTORY

The Mallory Capacitor Company manufacturing facility located in Waynesboro, Tennessee was used for the manufacture of electrical capacitors from 1969 to 1984. From the 1940's to 1968 the Site was owned by P.R. Mallory, a subsidiary of Duracell International, Inc.'s (Duracell's) corporate predecessors, from 1968 to July 31, 1979, after which Emhart Industries, Inc. took over ownership of the Site. Prior to the April 18, 1978, EPA ban on the use of polychlorinated biphenyls (PCBs), PCBs and trichloroethylene (TCE) are known to have been used during the manufacture of capacitors at the Site. Mallory (Duracell) used PCBs and TCE in its manufacturing and Emhart used TCE in its manufacturing process. Due to employee safety and regulatory concerns resulting from the PCB ban, cleanup actions were implemented at the Site from 1976 to 1980 to remove materials contaminated with PCBs from process equipment within the manufacturing facility.

These cleanup activities also included removing an underground tank located adjacent to the plant which was used for storage of waste liquids from the manufacturing process and removing soils contaminated with PCBs adjacent to the underground storage tank. Routine TCE still bottom testing in 1984 revealed PCB-containing still bottoms. Employees expressed concern to Emhart, who in turn notified EPA. The plant was subsequently shut down in July, 1984, due to unsafe working conditions.

2. REGULATORY ACTION

As a result of litigation between Emhart and Duracell from 1985 to 1988 over PCB liability, Duracell agreed to take back the Mallory Site with all associated liability. All of Duracell's liabilities concerning the Site were assumed by its holding company Kraft, Inc. (Kraft). Kraft titles the Waynesboro facility Battery Properties, Inc. (the PRP).

Investigative programs were conducted at the Site during the period of 1984 to 1988 by Emhart to identify the nature and extent of chemical contamination at the Site. Significant concentrations of PCBs were identified in portions of the plant structure, on some of the process equipment within the plant, in soils in various areas of the Site, and in groundwater beneath the Site. Significant concentrations of volatile organic compounds (VOCs) were also identified in the groundwater.

In 1985, approximately one year following the closure of the plant, the Tennessee Department of Health and Environment (TDHE) conducted an investigation and Hazard Ranking System (HRS) evaluation of the Site and of the underlying bedrock unit. The bedrock beneath the Site consists of three distinct units of fractured dolomitic limestone. General groundwater flow direction is northeasterly toward the Green River and is disrupted with fractures and lenses. As a result of TDHE's evaluation, the HRS Score for the Site of 30.8 was compiled. The Site was subsequently proposed for inclusion on the National Priorities List (NPL) in January of 1987 and was formally placed on the NPL on October 4, 1989.

3. EMERGENCY REMOVAL ACTION

Because of the above removal actions, no Emergency Removal Action was conducted at the Site.

4. REMEDIAL INVESTIGATION/FEASIBILITY STUDY

As a result of the proposed inclusion of the Site on the NPL in 1987, the PRP of the Site, entered into negotiations with EPA, Region IV, to conduct a Remedial Investigation and Feasibility Study (RI/FS) at the Site. The negotiations culminated in an Administrative Order by Consent (Consent Order), effective February 18, 1988, which required the PRP to conduct the RI/FS at the Site at EPA's direction.

At a meeting between Duracell and EPA on April 5, 1988, to review the RI/FS Work Plan, it was agreed that several programs associated with remediation of the Site would be implemented by the PRP in conjunction with the RI/FS process. The programs included the following: 1. cleaning and disposition of equipment within the Plant, exclusive of equipment located within the impregnation room of the Plant; 2. Cleaning and disposition of stock within the Plant; 3. Demolition and removal of the impregnation room of the Plant, including annexed buildings and all equipment contained therein, and the Plant's air handling systems; 4. Excavation and disposal of soils contaminated with PCBs at concentrations of greater than 10 milligrams per kilogram; and 5. cleaning of floor, wall, ceiling and overhead surfaces within the remaining portions of the Plant (the warehouse).

The RI report was finalized by EPA in January 1991. The report was prepared by CRA and concluded that with respect to the above-mentioned removal operations no significant risk was posed by residually contaminated surface soils or surface water. However, the report did conclude significant groundwater contamination was present in the shallow and deep aquifers on Site, east of the Site and north of the Site. Groundwater was found to contain the following site specific contaminants at the stated levels;

	PCBs(ug/l)	TCE(ug/l)
shallow aquifer	70,000	250,000
deep aquifer	100,000	170,000

The presence of 1,2-dichloroethene (1,2-DCE) was masked by the high concentrations of TCE.

The FS report accepted as the final by EPA was dated May 8, 1991. The report was prepared by CRA and presented several alternative treatment schemes for handling the groundwater remedy at the Site. The PRP and EPA agreed upon the Remedial Alternative for the Site provided for hydraulic containment of Site-related contaminated groundwater and on-Site containment mass removal utilizing groundwater extraction wells, treatment of the extracted groundwater by solids precipitation, air stripping, bag filtration and carbon adsorption, and discharge of treated groundwater to the Green River surface waters east of the Site. The above alternative was incorporated into the Record of Decision (ROD).

5. RECORD OF DECISION

The ROD was signed by EPA on August 29, 1991. The ROD selected a remedy to treat groundwater contamination at the Site. In September 1991, the PRP and EPA entered into negotiations to conduct groundwater Remedial Design/Remedial Action (RD/RA) for the Site for the remediation of groundwater. The PRP and EPA did not agree on cleanup levels for site specific contaminants. Because of this, on March 4, 1992, EPA issued a Unilateral Administrative Order (UAO) to the PRP (EPA Docket No. 92-19-C, pursuant to Section 106(a) of CERCLA, as amended, 42 U.S.C. Section 9606(a), requiring the PRP to undertake the groundwater remediation at the Site as presented in the ROD.

The objectives of the Remedial Action (RA) are to:

- Eliminate or minimize the threat posed to public health and the environment from current and potential migration of hazardous substances in groundwater beneath the Site;
- Reduce concentrations of hazardous substances, pollutants and contaminants in groundwater beneath the Site to Performance Standard levels of at or below the following maximum contaminant levels (MCLs):

Groundwater Contaminant	MCL (ug/l)
PCBs	0.5
Cis 1,2-DCE	70
trans 1,2-DCE	100
TCE	5.0

- Reduce the volume, toxicity and mobility of hazardous substances, pollutants or contaminants in groundwater beneath the Site;
- Maintain the air quality at protective levels for on- Site workers and the public during the long term operation of the on- Site groundwater treatment system.

6. REMEDIAL DESIGN/REMEDIAL ACTION (RD/RA)

The ROD allowed the RD/ RA to be undertaken at the Site in a two phased approach. The RD/ RA followed this phased approach in the following manner;

Phase I

- construction of individual forcemains and controls from each extraction well to and/ on-Site treatment facility;
- treatment of the extracted groundwater by air stripping, bag filtration and carbon adsorption;
- discharge of the treated groundwater to the surface water adjacent to the Site;
- implementation of an effectiveness monitoring program to determine the effectiveness of the remedial actions;
- assessment of the on-Site groundwater extraction system performance for a period of approximately one year.

Phase II

- finalization of the design of the hydraulic containment of Site-related contaminated groundwater based on Site specific data from one year's operation and performance of the five on-Site extraction wells installed during Phase I;
- installation of hydraulic containment extraction wells and individual forcemains and controls from each extraction well to the groundwater treatment facility installed during Phase I;
- operation of the on-and off-Site extraction wells until the Performance Standards for the Site-related contaminated groundwater at and in the vicinity of the Site are satisfied;
- continuation of the effectiveness monitoring program initiated during Phase I;
- additional monitoring required by the ROD.

The PRP completed construction and startup for the Phase I RA at the Site on November 30, 1993. The PRP then submitted the final Phase I RA Operation, Maintenance and Monitoring Plan (OMMP) in March 1995. Meanwhile, as of November 30, 1994, the PRP had operated the groundwater collection and treatment system at the Site for the one year period and began compiling the Phase I Technical Evaluation (PITE). The final PITE was submitted to EPA in February 1995 and was subsequently used to develop the Phase II Remedial Design (RD). This RD required maximizing the pumping rates of the extraction wells, the installation of additional extraction wells, the addition of a separate treatment system for one extraction well and better hydraulic characterization.

The retrofit of the Phase I treatment system into the Phase II treatment system was conducted from October 9, 1995 to December 6, 1995.

II. SITE CONDITIONS

A. SUMMARY OF SITE VISIT

A pre-Final Construction Inspection was completed on December 6, 1995, and subsequently the Phase II RA treatment system startup was conducted on December 7, 1995. After several minor system modifications, the OMMP for the Phase II RA was approved by EPA on June 7, 1996.

The Site Visit/Final Construction Inspection was conducted on June 28, 1996, by representatives from EPA, TDEC and the PRP.

A follow-up Site Visit was held on June 4, 1998, by EPA, TDEC and PRP representatives. The PRP is making the additional Site related geophysical studies as directed by EPA based on the TE. Results of the geophysical study may allow the PRP to maximize contaminated groundwater plume capture and treatment.

B. AREA OF NONCOMPLIANCE

The inspection showed the system to be operational within currently acceptable parameters.

C. SUMMARY OF INTERVIEWS

During the follow-up site visit, on June 4, 1998, EPA conducted interviews of the TDEC representative and nearby residents. Those interviewed were: 1. Mr. Tom Nutt, former employee, started at facility in 1952, had no concerns about the ongoing remediation; 2. Mr. Howard Ray, adjacent resident, 124 Belew Circle, was concerned about the length of time it is taking for the remediation. EPA explained the nature of the remediation to him; 3. Mr. James Huckabee, adjacent resident, 122 Belew Circle, had the same concerns as those of Mr. Ray. EPA responded in the same manner; and 4. Ms. Linda Locke, TDEC representative, is satisfied with the current status of remediation at the Site.

III. RECOMMENDATIONS

A. RECOMMENDATIONS

The Phase II TE was approved by EPA on August 16, 1996. As proposed by the TE the PRP investigated and reduced pumping rates in the extraction wells to attempt to maximize contaminant capture and at the same time minimize PCB expansion in the aquifers. The effect of this change was evaluated in 1997 and showed the system needed to be further modified. Additional geophysical study and technical evaluation are in progress to determine what modifications may be required. To demonstrate ongoing activities, please see the attached RD/RA Annual Progress Report.

B. STATEMENT OF PROTECTIVENESS

Activities at the Site were consistent with the ROD and UAO RD/ RA statement of work issued to the PRP for design and construction, including sampling and analysis. The RD Report, including a Quality Assurance Project Plan, incorporated all EPA and State quality assurance and quality control (QA/QC) procedures and protocol. EPA analytical methods were used for all validation and monitoring samples during RA activities. All sampling followed the EPA protocol Test Methods for Evaluating Solid Wastes, Physical/ Chemical Methods. Sample analyses were performed by Quanterra Environmental Services utilizing EPA approved methods and instrumentation.

The QA/QC program used throughout the RA was rigorous and adequately complied with; therefore, EPA and the State determined that all analytical results are accurate to the degree needed to assure satisfactory execution of the RA, and consistent with the ROD and RD plans and specifications.

The Phase II RA Technical Evaluation (TE) contains documentation of sampling results. The June 7, 1996, approved Operation, Maintenance and Monitoring Plan (OMMP) provides the QA/QC procedures and protocol for remaining RA activities. For documentation, the current monthly sample analyses are attached.

C. ON-GOING MONITORING REQUIREMENTS

Primary construction completion at the Site was documented by the attached Preliminary Close Out Report.

As documented in the June 7, 1996, OMMP and the August 16, 1996, approved Phase II TE, contaminant extraction, treatment and monitoring at the Site will be on- going for the foreseeable future. Approved operational parameters will vary in accordance with changing contaminant and contaminant migration characteristics. Considering the above conditions, the following activities will be completed according to the following schedule:

TASK	ESTIMATED COMPLETION	RESPONSIBLE ORGANIZATION
1. Complete Groundwater Pump and Treat	09/2026	PRP
2. Complete Remedial Action Report	11/2026	PRP
3. Approve Remedial Action Report	01/2027	EPA
4. Approve Final Close Out Report	01/2027	EPA

D. NEXT REVIEW

The next Five-Year Review will be completed prior to June 30, 2003.

PRELIMINARY CLOSE OUT REPORT

**MALLORY CAPACITOR CO.
TND075453688
WAYNESBORO, WAYNE COUNTY
TENNESSEE**

I. INTRODUCTION

This Preliminary Close Out Report documents the Potentially Responsible Party (PRP) has completed all construction activities for the Mallory Capacitor Co. Site (the Site) in accordance with *Procedures for Completion and Deletion of National Priorities List Sites* (OSWER Directive 9320.2-09). The PRP is Battery Property, Inc. (BPI), and their consultant is Conestoga-Rovers & Associates (CRA). The United States Environmental Protection Agency (EPA), the Tennessee Department of Environment and Conservation (TDEC) and CRA representatives conducted a Final Construction Inspection of the Long-Term Remedial Action (LTRA) on June 26, 1996. EPA determined the PRP has constructed the remedy in accordance with the Remedial Design (RD) plans and specifications. The PRP has initiated activities necessary to achieve performance standards and site completion.

II. SUMMARY OF SITE CONDITIONS

BACKGROUND

SITE LOCATION

The Mallory Capacitor Company Site is located on Belew Circle, Waynesboro, Wayne County, Tennessee on the western bank of the Green River. This 8.6-acre site is located in a residential/commercial/industrial/ business area which lies on the Green River in the eastern section of Waynesboro. Highway 13 passes just West of the Site. The Site is located on land which is zoned I-1, Restrictive Industrial District. Under I-1 zoning, all operations must be performed within completely enclosed buildings and off-street parking and loading facilities must be provided. The land to the north of the Site is zoned R-C, Multiple Residential/Commercial District. R-C zoning is designed to provide adequate space for office and commercial uses mutually compatible with higher density residential areas. To the west and south of the Site, the land is primarily zoned R-2, Residential, Medium/High Density. R-2 zoning is designed to accommodate relatively large numbers of dwelling units close to public schools and other community facilities. The Tennessee Department of Economic and Community Development has estimated the 1990 population of Waynesboro at 1,824 persons and that of Wayne County at 13,935 persons.

The U.S. Department of the Interior, Fish and Wildlife Service, has confirmed that there are no wetlands, endangered species or critical habitats that are impacted by the Site. The office of the City Manager in Waynesboro has also stated that no historical landmarks are being impacted by the Site. Likewise, the County Agricultural Service has stated that no agricultural lands have been impacted by the Site.

The geology of the Site as interpreted from surface and subsurface features consists of three stratigraphic units, namely alluvial deposits, residual soils, and bedrock. All three units are encountered across the Site at varying depths. The alluvial deposits consist of red to brown silts and sands with some clay and gravel and vary in depth from eight feet on the western side of the Site to zero feet where it feathers out at the edge of the Green River which borders the east side of the Site. The residual soils, with a maximum encountered depth of approximately eight feet, consist of brown to tan mottled clay silts resulting from in- situ weathering.

The Fort Payne Formation is the aquifer used for water. The city is mostly served by municipal potable water and sewer systems, with a few private water supplies. Within a 1-mile radius of the Site, 54 private water sources have been identified, consisting of 27

drilled wells, 19 dug wells, and eight springs. The nearest private water source to the Site was identified to be a spring, located approximately 1,200 feet to the west.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

The Mallory Capacitor Company manufacturing facility located in Waynesboro, Tennessee was used for the manufacture of electrical capacitors from 1969 to 1984. From the 1940's to 1968 the site was utilized in the manufacture of footwear. The Site was owned by P. R. Mallory, a subsidiary of Duracell International, Inc. 's (Duracell's) corporate predecessors, from 1968 to July 31, 1979, after which Emhart Industries, Inc. took over ownership of the Site. Prior to the April 18, 1978, EPA ban on the use of polychlorinated biphenyls (PCBs), PCBs and trichloroethene (TCE) are known to have been used during the manufacture of capacitors at the Site. Mallory (Duracell) used PCBs and TCE in its manufacturing process while Emhart used TCE in its manufacturing process. Due to employee safety and regulatory concerns resulting from the PCB ban, cleanup actions were implemented at the Site from 1976 to 1980 to remove materials contaminated with PCBs from process equipment within the manufacturing facility.

These cleanup actions also included removing an underground tank located adjacent to the plant which was used for storage of waste liquids from the manufacturing process and removing soils contaminated with PCBs adjacent to the underground storage tank. Routine TCE still bottom testing in 1984 revealed PCB-containing still bottoms. Employees expressed concern to Emhart, who in turn notified EPA. The plant was subsequently shut down in July, 1984, due to unsafe working conditions. As a result of litigation between Emhart and Duracell from 1985 to 1988 over PCB liability, Duracell agreed to take back the Mallory Site with all associated liability. All of Duracell's liabilities concerning the Site were assumed by its holding company Kraft, Inc. Kraft titled the Waynesboro facility Battery Properties, Inc. (the PRP).

Investigative programs were conducted at the Site during the period of 1984 to 1988 by Emhart to identify the nature and extent of chemical contamination at the Site. Significant concentrations of PCBs were identified in portions of the plant structure, on some of the process equipment within the plant, in soils in various areas of the Site, and in ground water beneath the Site. Significant concentrations of volatile organic compounds (VOCs) were also identified in the groundwater.

In 1985, approximately one year following closure of the plant, the Tennessee Department of Health and Environment (TDHE) conducted an investigation and Hazard Ranking System (HRS) evaluation of the Site and of the underlying bedrock unit. The bedrock beneath the Site consists of three distinct units of fractured dolomitic limestone. General groundwater flow direction is northeasterly toward the Green River and is disrupted with fractures and lenses. As a result of TDHE's evaluation, the HRS score for the Site of 30.8 was compiled. The Site was subsequently proposed for inclusion on the National Priorities List (NPL) in January of 1987 and was formally placed on the NPL on October 4, 1989.

RI/FS SUMMARY

As a result of the proposed inclusion of the Site on the NPL in 1987, the PRP of the Site, entered into negotiations with EPA Region IV to conduct a Remedial Investigation and Feasibility Study (RI/FS) at the Site. The negotiations culminated in an Administrative order by Consent (Consent Order), effective February 18, 1988, which required the PRP to conduct the RI/FS at the Site at EPA's direction. At a meeting between EPA and Duracell on April 5, 1988, to review the RI/FS Work Plan, it was agreed that several programs associated with remediation of the Site would be implemented by the PRP in conjunction with the RI/FS process. The programs included the following: 1. cleaning and disposition of equipment within the Plant, exclusive of equipment located within the impregnation room of the Plant; 2. cleaning and disposition of stock within the Plant; 3. demolition and removal of the impregnation room of the Plant, including annexed buildings and all equipment contained therein, and the Plant's air handling systems; 4. excavation and disposal of soils contaminated with PCBs at concentrations of greater than 10 milligrams

per kilogram; and 5. cleaning of floor, wall, ceiling and overhead surfaces within the remaining portions of the Plant (the warehouse).

The PRP retained Conestoga-Rovers & Associates, Limited (CRA) to manage the remedial programs. Severson Environmental Services was retained under the supervision of CRA to implement the equipment and stock disposition. Chemical Waste Management, Inc./ENRAC was retained under the supervision of CRA to implement the partial plant demolition and soil removal at the Site. In addition to the aforementioned removal actions, the RI consisted of a field sampling and analysis program followed by validation and evaluation of the data collected. The field work was conducted during the following periods: November, 1988 - May, 1989; August, 1989; and February, 1990 - April, 1990. The PRP retained CRA to conduct the field work. Oversight work was conducted by Lee Wan & Associates, EPA's TES VII contractor.

The RI report was accepted as final by EPA in January 1991. The report was prepared by CRA and concluded that with respect to the above mentioned removal operations no significant risk was posed by residually contaminated surface soils or surface water. However, the report did conclude significant groundwater contamination was present in the shallow and deep aquifers on Site, east of the Site and north of the Site. Groundwater was found to contain the following site specific contaminants at the stated levels;

	PCBs (ug/l)	TCE(ug/l)
shallow aquifer	70,000	250,000
deep aquifer	100,000	170,000

The presence of 1,2-dichloroethene (1,2-DCE) was masked by the high concentrations of TCE.

The FS Report accepted as the final by EPA was dated May 8, 1991. The report was prepared by CRA and presented several alternative treatment schemes for handling the groundwater remedy at the Site. The PRP and EPA agreed upon the Remedial Alternative for the Site provided for hydraulic containment of Site-related contaminated groundwater and on- Site contaminant mass removal utilizing groundwater extraction wells, treatment of the extracted groundwater by solids precipitation, air stripping, bag filtration and carbon adsorption, and discharge of treated groundwater to the Green River surface waters east of the site. The above alternative was incorporated into the Record of Decision (ROD).

RECORD OF DECISION SUMMARY

The ROD was signed by EPA on August 29, 1991. The ROD selected a remedy to treat groundwater contamination at the Site. In September 1991, the PRP and EPA entered into negotiations to conduct groundwater Remedial Design/Remedial Action (RD/RA) for the Site for the remediation of groundwater. The PRP and EPA did not agree on cleanup levels for site specific contaminants. Because of this, on March 4, 1992, EPA issued a Unilateral Administrative Order (UAO) to the PRP (EPA Docket No. 92-19-C, pursuant to Section 106(a) of CERCLA, as amended, 42 U.S.C. Section 9606 (a), requiring the PRP to undertake the groundwater remediation at the Site as presented in the ROD.

The objectives of the Remedial Action (RA) are to:

- Eliminate or minimize the threat posed to public health and the environment from current and potential migration of hazardous substances in groundwater beneath the Site;
- Reduce concentrations of hazardous substances, pollutants and contaminants in groundwater beneath the Site to Performance Standard levels of at or below the following maximum contaminant levels (MCLs):

Groundwater Contaminant	MCL (ug/l)
PCBs	0.5
cis 1,2-DCE	70
trans 1,2-DCE	100
TCE	5.0

- Reduce the volume, toxicity and mobility of hazardous substances, pollutants or contaminants in groundwater beneath the Site;
- Maintain the air quality at protective levels for on- site workers and the public during the long term operation of the on- Site groundwater treatment system.

The ROD allowed RD/RA to be undertaken at the Site in a two phased approach. The RD/ RA followed this phased approach in the following manner;

Phase I

- implementation of a ban on the installation of groundwater extraction wells;
- installation of two additional shallow bedrock monitoring wells north of the Site to determine the northern off-site extent of contaminated groundwater in the shallow bedrock aquifer;
- contaminant mass removal from the on-Site contaminated aquifers by the installation and operation of five extraction wells in areas of the on- Site contaminated aquifers that exhibit the highest concentrations of the Site- related contaminants;
- construction of individual forcemains and controls from each extraction well to an on- Site treatment facility;
- treatment of the extracted groundwater by air stripping, bag filtration and carbon adsorption;
- discharge of the treated groundwater to the surface water adjacent to the Site;
- implementation of an effectiveness monitoring program to determine the effectiveness of the remedial actions;
- assessment of the on-Site groundwater extraction system performance for a period of approximately one year.

Phase II

- finalization of the design of the hydraulic containment of Site-related contaminated groundwater based on Site specific data from one year's operation and performance of the five on-Site extraction wells installed during Phase I;
- installation of hydraulic containment extraction wells and individual forcemains and controls from each extraction well to the groundwater treatment facility installed during Phase I;
- operation of the on- and off-Site extraction wells until the Performance Standards for the Site-related contaminated groundwater at and in the vicinity of the Site are satisfied;
- continuation of the effectiveness monitoring program initiated during Phase I;
- additional monitoring as required by the ROD.

The PRP completed construction and startup for the Phase I RA at the Site on November 30, 1993. The PRP then submitted the final Phase I RA Operation, Maintenance and Monitoring Plan (OMMP) in March 1995. Meanwhile, as of November 30, 1994, the PRP had operated the groundwater collection and treatment system at the Site for the one year period and began compiling the Phase I Technical Evaluation (PITE). The final PITE was submitted to EPA in February and was subsequently used to develop the Phase II Remedial Design (RD). This RD required maximizing the pumping rates of the extraction wells, the installation of additional extraction wells, the addition of a separate treatment system for one extraction well and better hydraulic characterization.

The retrofit of the Phase I treatment system into the Phase II treatment system was conducted from October 9, 1995 to December 6, 1995.

PRE-FINAL AND FINAL CONSTRUCTION INSPECTIONS

The pre-Final Construction Inspection was completed on December 6, 1995, and subsequently the Phase II RA treatment system startup was conducted on December 7, 1995. After several minor system modifications, the OMMP for the Phase II RA was approved by EPA on June 7, 1996.

The Final Construction Inspection was conducted on June 28, 1996, by representatives from EPA, TDEC and the PRP. The inspection showed the system to be operational within acceptable parameters. To ensure continued compliance EPA requested the following:

- Redesign and replacement of the air duct heater element leading to the vapor phase carbon adsorption units. The PRP installed the redesigned heater element on August 2, 1996.
- Replacement of carbon in carbon in vapor phase carbon adsorption units. The PRP replaced the carbon on July 30 and August 1, 1996.
- Assurance that well field cones of depression capture all site specific contaminants. The PRP addressed this in the Phase II TE.

The Phase II TE was approved by EPA on August 16, 1996. As proposed by the TE the PRP will investigate and reduce pumping rates in the extraction wells to maximize contaminant capture and at the same time minimize PCB expansion in the aquifers. The effect of this change will be evaluated in six months.

III. DEMONSTRATION OF CLEANUP ACTIVITY QUALITY ASSURANCE AND QUALITY CONTROL

Activities at the Site were consistent with the ROD and UAO RD/RA statement of work issued to the PRP for design and construction, including sampling and analysis. The RD Report, including a Quality Assurance Project Plan, incorporated all EPA and State quality assurance and quality control (QA/QC) procedures and protocol. EPA analytical methods were used for all validation and monitoring samples during RA activities. Sampling of soil, sediments and water followed the EPA protocol Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods. Sample analyses were performed by Quanterra Environmental Services utilizing EPA approved methods and instrumentation.

The QA/QC program used throughout the RA was rigorous and adequately complied with; therefore, EPA and the State determined that all analytical results are accurate to the degree needed to assure satisfactory execution of the RA, and consistent with the ROD and RD plans and specifications.

The Phase II RA Technical Evaluation (TE) contains documentation of sampling results to date. The June 7, 1996 approved Operation, Maintenance and Monitoring Plan (OMMP) provides the QA/QC procedures and protocol for remaining RA activities.

IV. ACTIVITIES AND SCHEDULE FOR SITE COMPLETION

Construction completion at the Site shall be documented by the signature of this Preliminary Close Out Report.

As documented in the June 7, 1996 OMMP and the August 16, 1996 approved Phase II TE, contaminant extraction, treatment and monitoring at the site will be on-going for the foreseeable future. Approved operational parameters will vary in accordance with changing contaminant characteristics. Considering the above conditions, the following activities will be completed according to the following schedule:

Task	Estimated Completion	Responsible Organization
1. TE Six Month Hydraulic Review	02/97	PRP/EPA
2. Complete Groundwater Pump and Treat	09/26	PRP
3. Complete Remedial Action Report	11/26	PRP
4. Approve Remedial Action Report	01/27	EPA
5. Approve Final Close Out Report	01/27	EPA

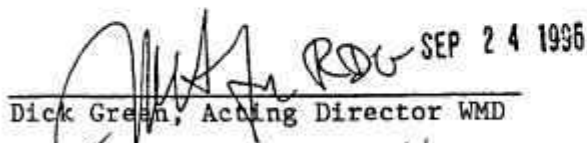
V. FIVE-YEAR REVIEW

Upon completion of this remedy, no hazardous substances will remain on-Site above levels that prevent unlimited use and unrestricted exposure. However, because the remedy will require greater than five years to achieve these levels, pursuant to CERCLA section 121(c) and as provided in OSWER Directive 9355.7-02, Structure and Components of Five-Year Reviews, May 23, 1991, and OSWER Directive 9355.702A, Supplemental Five-Year Guidance, July 26, 1994, EPA must conduct a policy five-year review. This Report serves as the initial five-year review after the September 1991 ROD. The next Five-Year Review will be completed prior to September 2001 (five years after the Preliminary Close Out Report signature).


Robert Morris, RPM


Harold Taylor, Chief KY/TN


Robert Jouffan, Chief NSRB


Dick Green, Acting Director WMD
SEP 24 1996
9/19/96



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
NASHVILLE ENVIRONMENTAL FIELD OFFICE
537 BRICK CHURCH PARK DRIVE
NASHVILLE, TENNESSEE 37243-1550

August 30, 1996

REC'D.
SEP 10 1996
WPB-JAS

Robert P. Morris
Remedial Project Manager
U.S. EPA, Region 4
345 Courtland Street, N.E.
Atlanta, Georgia 30365

RE: Mallory Capacitor Co. Preliminary Close Out Report

Dear Mr. Morris:

The Tennessee Division of Superfund has reviewed the Preliminary Close Out Report for Mallory Capacitor Co. and has no comments. Thank you for sending it for our review.

Sincerely,

A handwritten signature in cursive script that reads "John Kizer".

John Kizer
Tennessee Division of Superfund
Nashville Field Office

xc: DSF Central Office

ANNUAL PROGRESS REPORT NO. 6

REMEDIAL DESIGN/REMEDIAL ACTION
MALLORY CAPACITOR CO. SITE
WAYNESBORO, TENNESSEE

PERIOD: APRIL 1, 1997 TO MARCH 31, 1998

This Progress Report is submitted in accordance with Section XV of the Unilateral Administrative Order (Order) for Remedial Design/Remedial Action (RD/RA) of the groundwater remedy at the Mallory Capacitor Co. Site (Site) in Waynesboro, Tennessee (USEPA Docket Number 92-19-C).

A. TASK PERFORMED THIS PERIOD

1. Prepared and submitted monthly progress reports to the United States Environmental Protection Agency (USEPA) on April 10, May 8, June 6, July 9, August 7, September 9, October 10, November 8, December 8, 1997, and January 9, February 5, and March 10, 1998, in accordance with Section XV of the Order.
2. Prepared and submitted correspondence to USEPA dated September 26, October 24, November 17, December 22, 1997, and February 23, 1998 summarizing polychlorinated biphenyl (PCB) results for Green River sediment samples.
3. Prepared and submitted correspondence to USEPA dated May 12, 1997, concerning the shipment of hazardous waste under manifest number IL6785419.
4. Prepared and submitted correspondence to USEPA dated July 17, 1997, requesting approval to proceed with the additional modifications to the groundwater extraction system.
5. Prepared and submitted correspondence to USEPA dated July 28, 1997 documenting the discharge exceedance for PCBs in the treated effluent.
6. Prepared and submitted correspondence to USEPA dated July 31, 1997 concerning USEPA's verbal approval on July 31, 1997 to proceed with the additional modifications to the groundwater extraction system proposed in correspondence dated July 17, 1997.
7. Prepared and submitted correspondence to USEPA dated August 1, 1997, concerning the analytical results of the confirmatory sampling of the treated water effluent.
8. Prepared and submitted to USEPA on September 18, 1997, the Draft Technical Evaluation Report for the Phase II Remedial Action Modifications Groundwater Extraction and Treatment Systems and a cover letter describing the schedule for the continued Phase II Remedial Action operations.
9. Received correspondence from USEPA dated December 2, 1997, transmitting the comments on the Draft Technical Evaluation Report for the Phase II Remedial Action Modifications dated September 1997.
10. Prepared and submitted to USEPA on January 13, 1998, responses to USEPA comments dated September 5, 1997 on the Draft Technical Evaluation Report for the Phase II Remedial Action Modifications dated and provided revisions to the Technical Evaluation Report.

11. Received correspondence from USEPA dated February 10, 1998, concerning a "Demand for Payment" from Battery Properties, Inc. for oversight costs incurred by USEPA from March 5, 1992 through September 30, 1997.
12. Prepared and submitted correspondence to USEPA dated February 13, 1998, revising the emergency telephone numbers associated with the Response Procedures Contingency Plan for On-Site and Off-Site Emergencies dated December 1993.
13. Prepared and submitted correspondence dated February 23, 1998, documenting the telephone conversation on January 22, 1998 between the Tennessee Department of Environment Conservation (TDEC) and CRA concerning karst features at the Site.
14. Received correspondence from USEPA dated February 24, 1998, transmitting USEPA's comments on CRA's responses dated January 13, 1998.
15. Prepared and submitted to USEPA on March 17, 1998, the Final Technical Evaluation Report for the Phase II Remedial Action Modifications and a cover letter describing the proposed karst hydrogeologic investigation and schedule for continued Phase II Remedial Action operations.
16. Received correspondence from USEPA dated March 18, 1998, approving the Final Technical Evaluation Report for the Phase II Remedial Action Modifications dated March 1998.

B. TASKS REMAINING TO BE PERFORMED

1. Continue operation, maintenance, and performance evaluation of the Phase II groundwater remedy.
2. Continue implementation of the long-term groundwater effectiveness monitoring program.
3. Continue preparation and submittal of monthly and annual progress reports to USEPA.

C. PROJECT SCHEDULE

1. The overall project schedule for the RD/ RA of the groundwater remedy selected for the Site was presented in the July 8, 1992 RD Work Plan. A more aggressive schedule for the Phase II groundwater extraction and treatment systems was presented in the Phase II RD Work Plan. All submittals and approvals to date have met this more aggressive schedule.

A revised schedule for continued Phase II Remedial Action Operations and potential investigations was presented in the March 17, 1998 correspondence. These additional tasks will be completed within the deadlines presented in the March 17, 1998 correspondence.

CRA

CONESTOGA-ROVERS & ASSOCIATES

1351 Oakbrook Drive, Suite 150

Norcross, Georgia 30093

(404)441-0027

Fax: (404) 441-2050

June 9, 1998

Reference No. 2319

Mr. Robert Morris
United States Environmental Protection Agency
Region IV
North Superfund Remedial Branch
Waste Management Division
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303

REC'D.
JUN 12 REC'D '98
WFD-SAS

Dear Mr. Morris:

Re: Monthly Progress Report
Mallory Capacitor Co. Site
Waynesboro, Tennessee

In accordance with Section XV of the Unilateral Administrative Order (Order) for Remedial Design/Remedial Action at the Mallory Capacitor Co. Site (Site) in Waynesboro, Tennessee, attached please find Monthly Progress Report No. 75. This report summarizes activities conducted during the period of May 1, 1998 to May 31, 1998 and is submitted on behalf of Battery Properties, Inc.

Final analytical data received on May 26, 1998 for the groundwater treatment system effluent sample collected on May 4, 1998 for polychlorinated biphenyls (PCBs), trichloroethylene, 1,2-dichloroethene, and vinyl chloride indicate the continuing compliance of the treated water effluent.

CRA has scheduled the change-out of the primary vapor phase and liquid phase carbon adsorption units based on the May 1998 treatment system component evaluation samples. Approximately 10,000 pounds of hazardous waste will be treated and disposed of at Chemical Waste Management's facility in Sauget, Illinois (Trade Waste Incineration). A copy of the manifests will be provided to the Environmental Protection Agency in Springfield, Illinois.

June 9, 1998

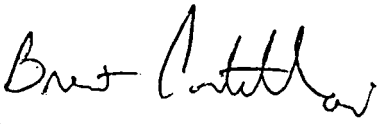
Reference No. 2319

-2-

Should you have any questions or require additional information, please do not hesitate to contact the undersigned.

Yours truly,

CONESTOGA - ROVERS & ASSOCIATES


for:

Jack Michels, P. Eng.

NP/vad/54

cc: L. Locke - TDEC (2 copies)
P. McAndrew - Battery Properties, Inc.
B. Cortelloni - CRA
G. Kestle - CRA

PROGRESS REPORT NO. 75

**REMEDIAL DESIGN/REMEDIAL ACTION
MALLORY CAPACITOR CO. SITE
WAYNESBORO, TENNESSEE**

PERIOD: MAY 1, 1998 THROUGH MAY 31, 1998

This Progress Report is submitted in accordance with Section XV of the Unilateral Administrative Order (Order) for Remedial Design/Remedial Action (RD/RA) of the groundwater remedy at the Mallory Capacitor Co. Site (Site) in Waynesboro, Tennessee (USEPA Docket Number 92-19-C).

I. GROUNDWATER EXTRACTION AND TREATMENT SYSTEM OPERATION, MAINTENANCE, AND MONITORING

In June 1993, Battery Properties Incorporated (BPI) submitted the Phase I Design Report - Final (Phase I DR) (CRA, June 1993) to USEPA. The Phase I DR presented the engineering details for the proposed Phase I RA. Startup operations of the Phase I RA occurred on November 30, 1993.

Following operation of the Phase I RA groundwater extraction and treatment systems at the Site for the 1-year data collection period, BPI submitted to USEPA the Technical Evaluation, Phase I RA, Groundwater Extraction and Treatment Systems Report (Phase I RA Technical Evaluation) (CRA, February 1995). The Phase I RA Technical Evaluation presented the proposed conceptual Phase II RD which included maximizing the on-Site pumping rates of extraction wells EW-1 and EW-2, increasing the capacity of the treatment system, and providing pretreatment to groundwater extracted from extraction well EW-5. Modifications to the Phase I RA groundwater extraction and treatment systems were conducted from October 9, 1995 to December 6, 1995. Startup operations of the Phase II RA groundwater extraction and treatment systems occurred on December 7, 1995.

Following operation of the Phase II RA groundwater extraction and treatment systems at the Site for a 6-month technical evaluation period, BPI submitted to USEPA the Technical Evaluation, Phase II RA, Groundwater Extraction and Treatment Systems Report (Phase II RA Technical Evaluation) (CRA, August 1996). The Phase II RA Technical Evaluation proposed the temporary sealing of the bottom portions of the extraction wells by installing inflatable packers in each of the five extraction wells and optimization of reduced pumping rates to decrease the downward hydraulic head differentials from the deep to the deeper bedrock. These Phase II RA modifications were proposed to reduce, or reverse, downward groundwater flow from the deep to the deeper bedrock.

On August 16, 1996, BPI received approval from USEPA of the Phase II RA Technical Evaluation. The Phase II RA modifications were initiated on September 4, 1996, and were continued to September 4, 1997. The results of the Phase II RA modifications and the proposed continued long term operation of the groundwater extraction and treatment systems were provided to USEPA in the Technical Evaluation, Phase II RA Modifications, Groundwater Extraction and Treatment Systems Report (Technical Evaluation - Phase II RA Modifications Report) (CRA, September 1997). BPI received comments from USEPA on December 2, 1997 concerning the Technical Evaluation - Phase II RA Modifications Report and provided responses to those comments on January 13, 1998. BPI received comments from USEPA on February 24, 1998 concerning BPI's responses dated January 13, 1998 to USEPA's comments. BPI submitted to USEPA the Final Technical Evaluation, Phase II RA Modifications Report and a cover letter describing the proposed karst hydrogeologic investigation and a schedule for continued Phase II RA operations on March 17, 1998. BPI received correspondence from USEPA dated March 18, 1998, approving the Final Technical Evaluation - Phase II RA Modifications Report.

Concurrent with the startup activities in December 1995, the operation, maintenance, and monitoring programs, as required by the Order, were initiated. These activities continued throughout this reporting period in accordance with the Phase II Operation, Maintenance,

and Monitoring Plan (OMMP) dated May 1996 for the Site. Activities conducted and data received in April 1998 are detailed in the following sections.

A. Extraction and Treatment System Operating Data

Extraction and treatment system process monitoring during the twenty-fourth month of operation of the Phase II groundwater extraction and treatment systems was conducted in accordance with the Master Monitoring Schedule which was presented to USEPA in the final OMMP dated May 1996. Tables 1 and 2 summarize the operation of the extraction and treatment system components from the process recording log sheets, which are maintained at the Site. Tables 3 through 7 summarize the detailed operation of each extraction well.

The treatment system essentially has been operational throughout the month of May 1998. Downtimes experienced were as follows:

- i) brief shut downs occurred during the month of May 1998 for change out of the bag filters in the bag filtration units; and
- ii) shut downs of different extraction wells occurred on several days during the operational period due to low water level alarms. These extraction wells are programmed to restart after a specific amount of time has passed to allow for well water recharge.

As calculated from the average flow data shown in Table 1, the estimated average flow rates during the period of May 1, 1998 to May 31, 1998 for, extraction wells EW-1, EW-2, EW-3, EW-4, and EW-5 were 0.2, 42, 8.9, 0.1, and 4.6 gallons per minute (gpm), respectively, and the average total discharge to the Green River was 50 gpm. For most of May 1998, the set flow rates for extraction wells EW-1, EW-2, EW-3, EW-4, and EW-5 were 2, 44, 7, 4, and 7 gpm, respectively, and the instantaneous total discharge to the Green River was approximately 64 gpm.

The calculated flow rates for EW-1, EW-3, EW-4, and EW-5 are much lower than the set flow rates due to the reprogramming that was conducted in March 1997. These extraction well pumps do not run continuous due to the low recharge rates for the associated extraction wells.

B. Alterations To Groundwater Extraction and Treatment Systems

No alterations to the groundwater extraction and treatment systems were conducted in May 1998.

C. Treatment System Sample Collection

Treated water sample collection was performed in accordance with the Master Monitoring Schedule presented to USEPA in the final OMMP dated May 1996. The monthly sampling of the treated water from the effluent discharge pipe at the Green River was conducted on May 4, 1998 for polychlorinated biphenyls (PCBs), trichloroethene (TCE), 1,2-dichloroethene (1,2-DCE), and vinyl chloride. Field measurements of conductivity, pH, and temperature also were recorded concurrent with the collection of the effluent sample.

In addition to the Master Monitoring Schedule sampling requirements, one water sample was collected between the carbon adsorption units and another between the resin units, both on May 4, 1998, to evaluate whether contaminant breakthrough may be occurring from the primary carbon adsorption unit or resin units. The sample collected between the carbon units was analyzed for TCE, 1,2-DCE, vinyl chloride, and PCBs. The sample collected between the resin units was analyzed only for PCBs.

D. Vapor Phase Carbon Air Emissions Monitoring

Vapor phase carbon air emissions quality monitoring was performed on May 4, 1998 in accordance with the Master Monitoring Schedule presented to USEPA in the final OMMP dated May 1996. The vapor phase carbon emissions monitoring consists of collecting TCE air emission measurements using a Sensidyne® detector tube system at locations before, between, and after the two vapor phase carbon units.

E. Analytical Data

Quanterra performed all laboratory analytical services.

In May 1998, CRA received final analytical data for the treatment system samples collected on May 4, 1998. Tables 8 and 9 present summaries of the analytical data for the treated water sample and treatment system component evaluation samples collected on May 4, 1998.

The results of the treated water sample collected on May 4, 1998, as summarized on Table 8, indicate that some 1,2-DCE breakthrough is occurring. However, the concentration reported is well below the allowable discharge limit for this compound as stipulated in the Order. The PCB analytical result for the treated water effluent sample collected on May 4, 1998 was reported as non-detect (ND) at an analytical detection limit of 0.5 g/L, indicating that the treatment system is in compliance.

The results of the between the treatment system component evaluation samples, as summarized on Table 9, indicate that some minor breakthrough of target analytes is occurring for the primary carbon unit. No contaminant breakthrough is occurring for the primary resin units. CRA has scheduled a change-out in June 1998 for the primary liquid phase carbon unit. CRA will continue to monitor the between system component locations to determine the appropriate change-out schedule for the primary resin units.

The results of the May 4, 1998 air emissions monitoring event are as follow:

	<i>TCE Concentration</i>	<i>Tons Per Year</i>
<i>May 4, 1998</i>		
Before	6 ppm	0.55
Between	2 ppm	0.18
After	2 ppm	0.18

These results indicate that the vapor phase carbon adsorption units are effective in the removal of the TCE from the off-gas of both air strippers, and that the final air emission is meeting the allowable discharge of two tons per year. However, CRA has scheduled the change-out in June 1998 of the carbon for the primary vapor phase carbon adsorption unit.

II. GROUNDWATER EFFECTIVENESS MONITORING PROGRAM

In accordance with the Master Monitoring Schedule presented to USEPA in the final OMMP dated May 1996, the effectiveness monitoring program consists of hydraulic monitoring (groundwater levels beneath and in the vicinity of the Site and surface water levels in the Green River), and groundwater and surface water quality monitoring.

A. Hydraulic Monitoring

The Master Monitoring Schedule requires water levels to be measured on a monthly basis for the first 12 months following startup of Phase II and annually thereafter.

The Technical Evaluation - Phase II RA Modifications Report was submitted to USEPA on September 18, 1997. The Technical Evaluation - Phase II RA Modifications Report recommended an additional one-year of monthly hydraulic monitoring following USEPA approval.

One round of water levels was measured in May 1998. Water levels were measured on May 4, 1998, at each of the 46 groundwater monitoring wells (22 on Site and 24 off Site), at the two off-Site piezometers, at the five on-Site groundwater extraction wells, and at the Green River. An electric water level indicator was used to collect the water level measurements at each monitoring and extraction well, piezometer, and surface water location. Decontamination of the water level indicator probe and the collection of water level measurements at each well, piezometer, and surface water location were conducted in accordance with the procedures outlined in the Quality Assurance Project Plan (QAPP) dated May 1996 for the Site (Section 12 of the Phase II OMMP).

The water level data measured on May 4, 1998 are presented in Table 10. The computer generated groundwater contours associated with the May 4, 1998 water level measurements are attached.

B. Water Quality Monitoring

In accordance with the Master Monitoring Schedule, water quality monitoring required during the operation of the Phase II groundwater extraction and treatment systems consists of the following:

- i) collection of groundwater samples from nine shallow bedrock monitoring wells (three on Site and six off Site), seven deep bedrock monitoring wells (three on Site and four off Site), and two on-Site deeper bedrock monitoring wells, at startup, six months following startup, and annually thereafter;
- ii) collection of surface water samples from three locations along Cold Water Creek and three locations along the Green River at startup, six months following startup, and annually thereafter; and
- iii) collection of groundwater samples from the five on-Site groundwater extraction wells on a monthly basis.

The next full groundwater and surface water sampling event is scheduled for July 1998.

The May 1998 monthly sampling of groundwater extraction wells EW-1, EW-2, EW-3, EW-4, and EW-5 was conducted on May 4, 1998. The extraction well water quality monitoring samples and groundwater monitoring well quality samples were submitted to Quanterra for the analysis of PCBs, TCE, 1,2-DCE, and vinyl chloride. Field measurements of conductivity, pH, and temperature were recorded for the samples collected on May 4, 1998.

C. Analytical Data

In May 1998, CRA received final analytical data for the water quality monitoring samples collected from the extraction wells on May 4, 1998. The final analytical data for the groundwater extraction well samples are

summarized in Table 11.

As reported in Monthly Progress Report No. 73 for March 1998, PCBs remained elevated in extraction well EW-4 and TCE remained elevated in extraction well EW-1. This is attributed to the decreased pumping rates which most likely have resulted in decreased dilution of the extracted groundwater from these two extraction wells.

III. GREEN RIVER SEDIMENT DATA

In accordance with the Master Monitoring Schedule presented to USEPA in the final OMMP dated May 1996, sediment samples are to be monitored monthly for PCBs from the Green River at a location (former sample location 272) 15 feet north and 6 feet east of the treatment system effluent discharge pipe.

The monthly sampling of the sediment in the Green River at former sample location 272 was conducted on May 4, 1998 and submitted to Quanterra for analysis of PCBs. The final analytical data were received on May 26, 1998. The sample result was reported as 1.6 mg/kg for former sample location 272.

Based on the PCB result for the river sediment sample collected on May 4, 1998, no further action is proposed for the sediment. CRA proposes to continue with the implementation of the monthly sediment sampling from the Green River.

IV. LABORATORY ANALYTICAL DATA REPORTS AND DATA VALIDATION

The data resulting from the analyses of the groundwater extraction and treatment system monitoring samples and the Green River sediment samples, were validated according to the requirements of the Site-specific QAPP. The precision and accuracy of the analyses were assessed based on surrogate spike recoveries, matrix spike recoveries, laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries and relative percent differences (RPD), method blank results, and check sample results. In addition, cross-contamination of volatile organic compounds through the septum seal of the sample vials during shipment and storage was monitored by a trip blank sample. The results of the validation procedure indicated that the data are suitable for their intended use with the following exceptions:

- The PCB LCS/ LCSD data associated with the May 18, 1998 analyses were outside the control limits; therefore, the associated results for samples IW-050498-AP-949 thru -954, -956, and SD-050498-AP-958 should be qualified as estimated (J) for this parameter. Based on the outlying LCS/LCSD data, the samples were reanalyzed for PCBs.
- The extractions for the confirmatory PCB analyses were performed outside the allowable holding time period; therefore, the results associated with the second analyses (May 25, 1998) for all of the samples should be qualified as estimated (J) for positive results and the quantitation limit estimated (UJ) for negative results. The results associated with the May 25, 1998 analyses should be used for reporting purposes.

The completeness goal of 80 percent or greater specified in the QAPP was satisfied. A copy of the laboratory analytical data reports for the May 1998 groundwater extraction and treatment system monitoring samples and the Green River sediment sample is included with this Monthly Progress Report.

V. SUBMITTALS COMPLETED THIS REPORTING PERIOD

Submittals in May 1998 consisted of Monthly Progress Report No. 74 for April 1998.

VI. ACTIVITIES SCHEDULED FOR NEXT REPORTING PERIOD

Monthly effluent monitoring required by the Master Monitoring Schedule and Order will continue.

VII. PROJECT STATUS

All submittals to date have been in accordance with the schedule stipulated in the Order.

Monitoring and routine operation and maintenance of the groundwater extraction and treatment systems are being performed in accordance with the Phase II OMMP for the Site.

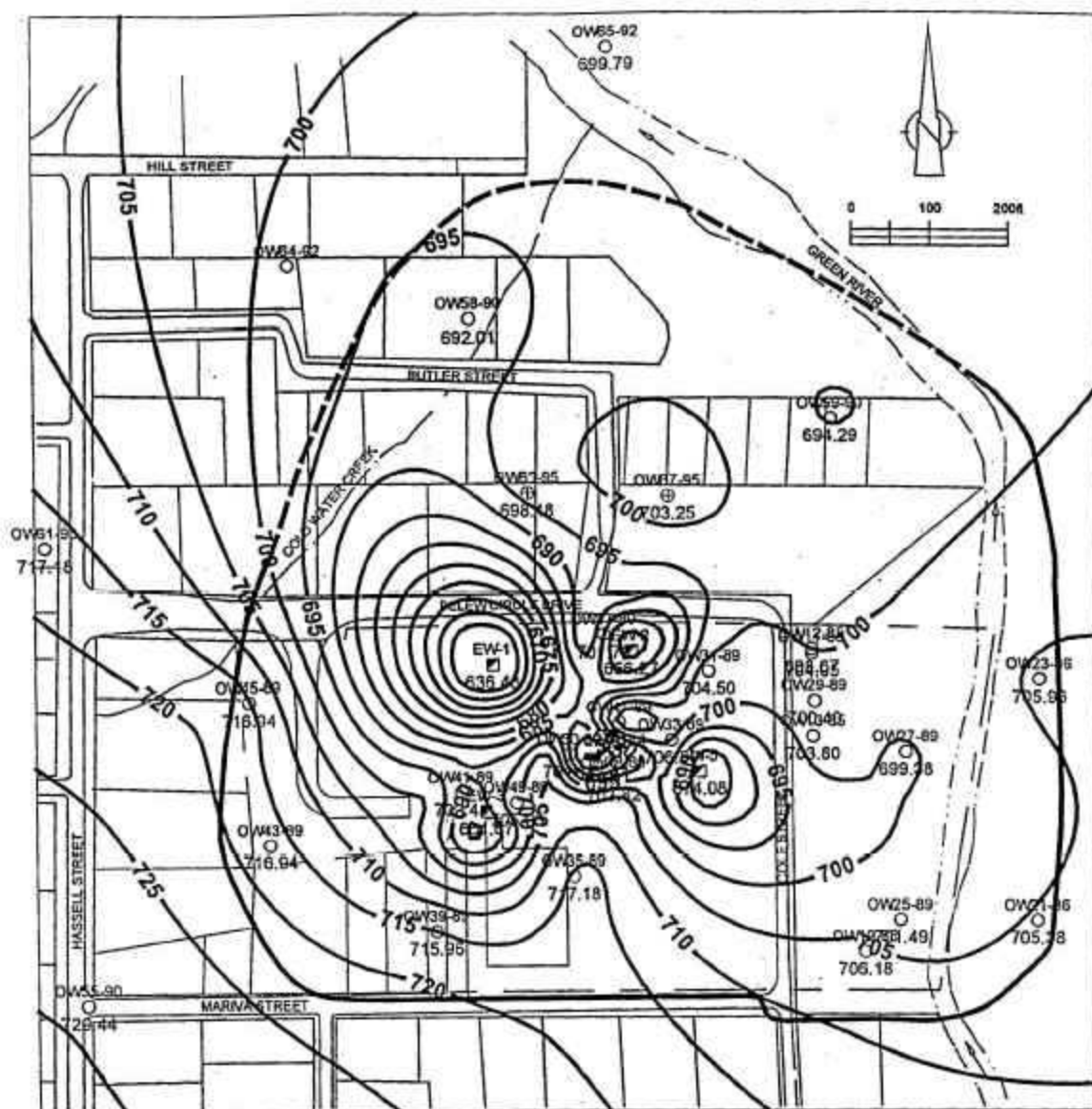
All of which is respectfully submitted,

CONESTOGA-ROVERS & ASSOCIATES

A handwritten signature in black ink, appearing to read 'Brent Cortelloni', with a stylized flourish at the end.

Brent Cortelloni

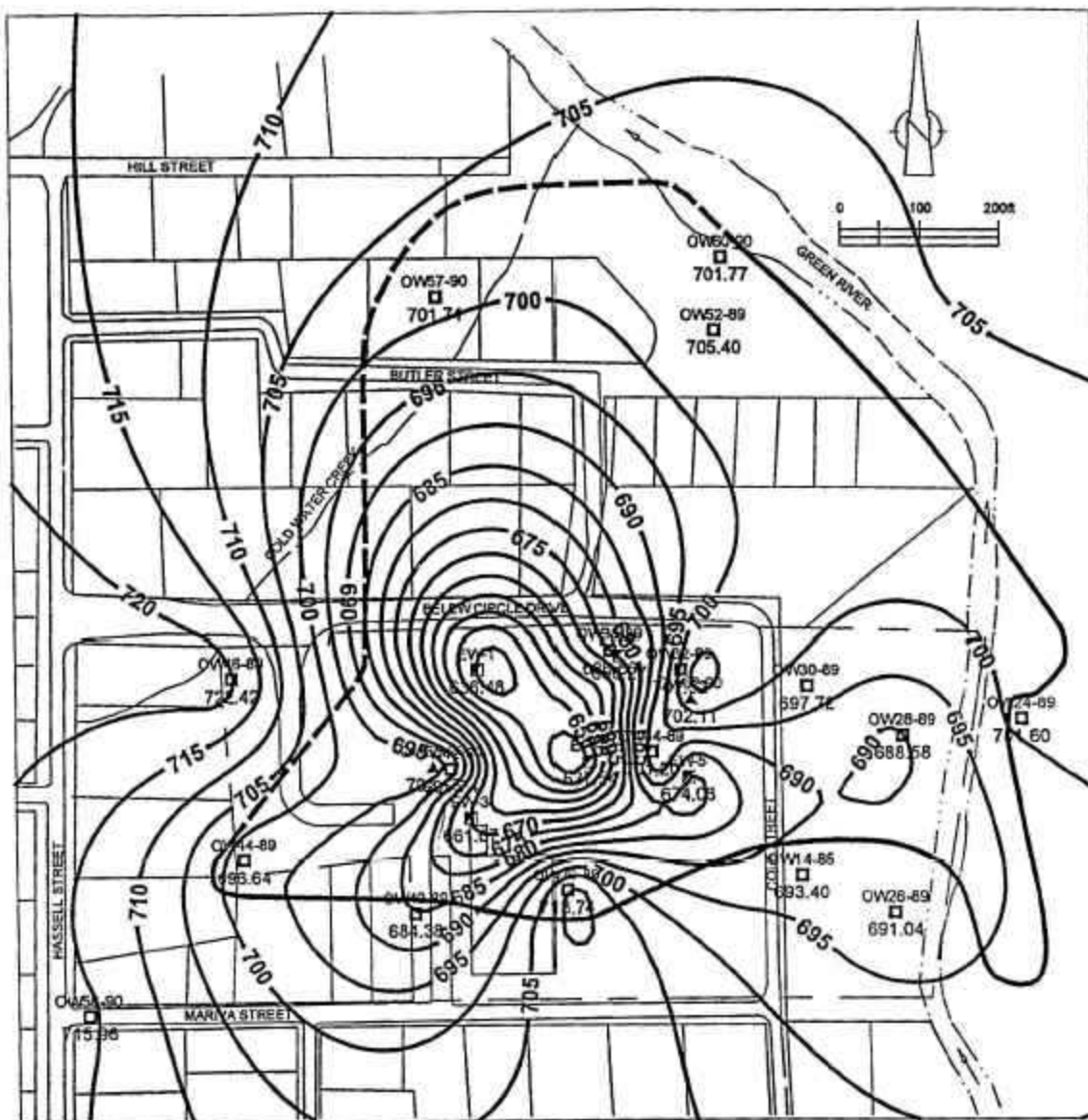
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Legend

- OW64-92 ○ Shallow monitoring well and observed groundwater elevation (ft AMSL), 701.18
- OW66-95 ⊕ Shallow piezometer and observed groundwater elevation (ft AMSL), 702.20
- EW1 ■ Extraction well and observed groundwater elevation (ft AMSL), 650.52
- Approximate extent of shallow bedrock impact.

**SHALLOW BEDROCK
GROUNDWATER ELEVATION CONTOURS (ft AMSL)
MAY 4, 1998 WITHOUT OW64-92
PHASE II RA MODIFICATIONS
MALLORY CAPACITOR CO. SITE
Waynesboro, Tennessee**



Legend

- OW57-90 Deep monitoring well and observed groundwater elevation (ft AMSL).
- 695.52
- OW53-90 Deeper bedrock monitoring well.
- EW1 Extraction well and observed groundwater elevation (ft AMSL).
- 650.52
- Approximate extent of shallow bedrock impact.

DEEP BEDROCK
GROUNDWATER ELEVATION CONTOURS (ft AMSL)
MAY 4, 1998
PHASE II RA MODIFICATIONS
MALLORY CAPACITOR CO. SITE
Waynesboro, Tennessee

CRA

TABLE 1

EXTRACTION AND TREATMENT SYSTEM FLOW DATA
MALLORY CAPACITOR CO. SITE
WAYNESBORO, TENNESSEE

	<i>Accumulated Total Flow 3/3/97 (gallons)</i>	<i>Set Flow Rate (gpm)</i>	<i>Avg. Flow (l) from 1/8/96 to 1/30/96 (gpm)</i>	<i>Avg. Flow (l) from 1/30/96 to 2/29/96 (gpm)</i>	<i>Avg. Flow (l) from 2/29/96 to 3/15/96 (gpm)</i>	<i>Avg. Flow (l) from 3/15/96 to 5/1/96 (gpm)</i>	<i>Avg. Flow (l) from 5/1/96 to 6/4/96 (gpm)</i>	<i>Avg. Flow (l) from 6/4/96 to 7/3/96 (gpm)</i>	<i>Avg. Flow (l) from 7/3/96 to 8/5/96 (gpm)</i>	<i>Avg. Flow (l) from 8/5/96 to 9/4/96 (gpm)</i>	<i>Avg. Flow (l) from 9/4/96 to 10/2/96 (gpm)</i>	<i>Avg. Flow (l) from 10/2/96 to 11/4/96 (gpm)</i>	<i>Avg. Flow (l) from 11/4/96 to 12/3/96 (gpm)</i>	<i>Avg. Flow from 12/3/96 to 12/31/96 (gpm)</i>	<i>Avg. Flow from 12/31/96 to 1/22/97 (gpm)</i>	<i>System Down from 1/22/97 to 2/11/97 (gpm)</i>	<i>Avg. Flow from 2/11/97 to 3/3/97 (gpm)</i>
<i>Extraction Well</i>																	
EW-1	2855058	1.5	3.7	4.2	5.1	5.8	7.9	9.3	8.4	7.4	2.5 (2)	1.3 (2)	3.7 (2)	2.0 (2)	0.8 (2)	0	1.2 (2)
EW-2	14743828	24	18.4	26	15.5	35	39	39	38	39	20 (2)	8.4 (2)	11 (2)	9.0 (2)	8.5 (2)	0	19 (2)
EW-3	7116231	3	13.1	10.4	11.7	10	11	12	11	12	11 (2)	15 (2)	14 (2)	18 (2)	17 (2)	0	2.4 (2)
EW-4	2350447	1.5	3.3	3.3	3.5	4.1	6	6	5.8	6.1	1.8 (2) (3)	1.4 (2)	4.0 (2)	4.7 (2)	4.1 (2)	0	1.3 (2)
EW-5	2681172	1.5	1.7	3.2	4.4	4.8	4.9	5.6	4.6	5.8	3.8 (2)	4 (2)	6.3 (2)	5.6 (2)	5.9 (2)	0	1.3 (2)
<i>Treatment System</i>																	
Influent (4)	29746736	31.5	40.2	47.1	40.2	59	69	72	68	71	40	30	39	37	36.4	0	25
Effluent (4)	27724626	31.5	48.7	44.6	48.4	56	62	63	58	61	32	28	35	34	36	0	27
	<i>Accumulated Total Flow 6/4/98 (gallons)</i>	<i>Set Flow Rate (gpm)</i>	<i>Avg. Flow from 10/1/97 to 11/4/97 (gpm)</i>	<i>Avg. Flow from 10/1/97 to 11/4/97 (gpm)</i>	<i>Avg. Flow from 10/1/97 to 11/4/97 (gpm)</i>	<i>Avg. Flow from 10/1/97 to 11/4/97 (gpm)</i>	<i>Avg. Flow from 10/1/97 to 11/4/97 (gpm)</i>	<i>Avg. Flow from 10/1/97 to 11/4/97 (gpm)</i>	<i>Avg. Flow from 10/1/97 to 11/4/97 (gpm)</i>	<i>Avg. Flow from 10/1/97 to 11/4/97 (gpm)</i>	<i>Avg. Flow from 11/4/97 to 12/3/97 (gpm)</i>	<i>Avg. Flow from 12/3/97 to 12/31/97 (gpm)</i>	<i>Avg. Flow from 12/31/97 to 1/29/98 (gpm)</i>	<i>Avg. Flow from 1/29/98 to 3/5/98 (gpm)</i>	<i>Avg. Flow from 3/5/98 to 4/1/98 (gpm)</i>	<i>Avg. Flow from 4/1/1998 to 4/30/1998 (gpm)</i>	<i>Avg. Flow from 4/30/1998 to 6/4/1998 (gpm)</i>
<i>Extraction Well</i>																	
EW-1	2948787	2	0.2 (5)	0.1 (5)	0.1 (5)	0.1 (5)	0.1 (5)	0.1 (5)	0 (7)	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
EW-2	41285550	44	34	35	42	42	8	43	40.8	42	46	43	46	44	43	43	42
EW-3	9617023	7	3.2	3.2 (5)	3.6 (5)	3.4 (5)	3.4 (5)	2.7 (5)	1.8	2.3	4.3	4.9	1.8	3.6	4.4	5.3	8.9
EW-4	2436485	4	0.1 (5)	0.1 (5)	0.1 (5)	0.1 (5)	0.3	0 (6)	0.5	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1
EW-5	4929338	7	0.9 (5)	0.8 (5)	0.8 (5)	1.6 (5)	5.1	3.7 (5)	3.5	3.6	4.5	4.4	4.7	4.4	4.5	4.5	4.6
<i>Treatment System</i>																	
Influent (4)	61217183	64	38	39	47	47	17	50	47	48	55	53	52	53	52	53	56
Effluent (4)	58771052	64	40	41	48	47	18	49	43	46	52	51	54	52	52	51	50

Notes:

- The average flows listed for the extraction wells are less than the set flows, since the average flows account for the several system shut downs that occurred.
- CRA adjusted the flow rates through the month and continues to do so to optimize pumping rates per the Technical Evaluation Report.
- EW-4 flowmeter not functioning correctly, consequently this value is biased low.
- The difference between the influent and effluent flow readings is due to accuracy tolerances of the meters (± 2 percent) and water loss due to air stripping (± 2.5 percent).
- These extraction well pumps have been reprogrammed based on recharge data to restart after a low level shut off has occurred; consequently, they do not run continuously. The objective is to maintain a significant drawdown in each extraction well.
- Extraction well EW-4 was shutdown on July 7, 1997 due to a blown packer.
- EW-1 off until completion of system modifications.

TABLE 2
EXTRACTION AND TREATMENT SYSTEM OPERATING DATA
MALLORY CAPACITOR CO. SITE
WAYNESBORO, TENNESSEE
MAY 4, 1998

<i>Extraction Well</i>	<i>Normal Operating Range</i>	<i>Water Pressure (psig)</i>
EW-1	25 - 35	8 ⁽¹⁾
EW-2	5 - 100	44
EW-3	25 - 35	13 ⁽¹⁾
EW-4	15 - 50	3 ⁽¹⁾
EW-5	15 - 25	4.7 ⁽²⁾
<i>Process Tank/Sump</i>		<i>Liquid Levels (inches)</i>
Retention Tank	10 - 42	36
Reactor/Clarifier ⁽²⁾	--	--
Oil/Water Separator	38-42	40
Transfer Tank	4 - 48	24
Air Stripper 1 Sump	0 - 12	6
Air Stripper 2 Sump	0 - 12	6
55-Gallon Oil Storage	0 - 40	0
Supernatant Sump	2 - 8	6
Sludge Dewatering ⁽²⁾	--	--
<i>Process Location</i>		<i>Pressure Level Data (psig)</i>
Air Stripper 1 Blower	18 - 20	18
Air Stripper 2 Blower	20 - 26	24
Before EW-3 Bag Filter	24 - 70	NM ⁽²⁾
After EW-3 Bag Filter	24 - 70	NM
Before Pre-Carbon Bag Filters	5 - 40	15
After Pre-Carbon Bag Filters	5 - 30	18
Before Pre-Resin Bag Filters	20-45	26
After Pre-Resin Bag Filters	20-40	27
Before Carbon Adsorbers	1 - 16	10
Between Carbon Adsorbers	0 - 8	4
Before Post Treatment Bag Filters	1 - 4	2
Before Resin Units	10 - 35	27
After Resin Units	5 - 35	13
<i>Process Pump</i>		<i>Settings</i>
Sludge Pump ⁽³⁾	--	--
Supernatant Pump ⁽³⁾	--	--

Notes:

⁽¹⁾ The water pressure is outside the normal operating range due to the decreased flow in the associated extraction well.

⁽²⁾ NM - Not measured.

⁽³⁾ Process components not active.

TABLE 3

SUMMARY OF FLOW RATES AND OPERATING HOURS - EW-1
GROUNDWATER EXTRACTION SYSTEM
MALLORY CAPACITOR SITE
WAYNESBORO, TENNESSEE

<i>Date</i>	<i>Water Meter Reading Time</i>	<i>Water Meter Reading (total gallons)</i>	<i>Flow (gallons) Between Measurements</i>	<i>Pump Run Reading Time</i>	<i>Cumulative Operating Hours</i>	<i>Operating Hours Between Measurements/Downtime Between Measurements</i>			<i>Actual Flow Rate (gallons per minute)</i>	<i>Set Flow Rate</i>
April 30, '98	4/30/98 9:00	2940228	1950	4/30/98 16:57	8853.8	0.6	/	23.4	0.2	2
May 1, '98	--	--	--	5/1/98 15:07	8854.5	0.7	/	21.5	--	--
May 2, '98	--	--	--	--	--	--	/	--	--	--
May 3, '98	--	--	--	--	--	--	/	--	--	--
May 4, '98	5/4/98 9:00	2941593	1365	5/4/98 16:50	8856.3	1.8	/	71.9	0.2	2
May 5, '98	--	--	--	5/5/98 17:43	8856.9	0.6	/	24.3	--	--
May 6, '98	--	--	--	5/6/98 17:27	8857.5	0.6	/	23.1	--	--
May 7, '98	--	--	--	5/7/98 17:49	8858.1	0.6	/	23.8	--	--
May 8, '98	--	--	--	5/8/98 11:52	8858.5	0.4	/	17.6	--	--
May 9, '98	--	--	--	--	--	--	/	--	--	--
May 10, '98	--	--	--	--	--	--	/	--	--	--
May 11, '98	--	--	--	5/11/98 16:48	8860.3	1.8	/	99.3	--	--
May 12, '98	--	--	--	5/12/98 16:58	8860.8	0.5	/	23.7	--	--
May 13, '98	--	--	--	5/13/98 16:22	8861.4	0.6	/	22.8	--	--
May 14, '98	5/14/98 9:00	2944019	2426	5/14/98 16:15	8861.9	0.5	/	23.4	0.2	2
May 15, '98	--	--	--	5/15/98 16:16	8862.4	0.5	/	23.5	--	--
May 16, '98	--	--	--	--	--	--	/	--	--	--
May 17, '98	--	--	--	--	--	--	/	--	--	--
May 18, '98	--	--	--	--	--	--	/	--	--	--
May 19, '98	--	--	--	--	--	--	/	--	--	--
May 20, '98	--	--	--	--	--	--	/	--	--	--
May 21, '98	5/21/98 9:00	2945634	1615	--	--	--	/	--	0.2	2
May 22, '98	--	--	--	--	--	--	/	--	--	--
May 23, '98	--	--	--	--	--	--	/	--	--	--
May 24, '98	--	--	--	--	--	--	/	--	--	--
May 25, '98	--	--	--	--	--	--	/	--	--	--
May 26, '98	--	--	--	5/26/98 18:44	8867.7	5.3	/	261.2	--	--
May 27, '98	--	--	--	5/27/98 18:28	8868.1	0.4	/	23.3	--	--
May 28, '98	5/28/98 9:00	2947172	1538	5/28/98 17:15	8868.6	0.5	/	22.3	0.2	2
May 29, '98	--	--	--	5/29/98 15:56	8869.0	0.4	/	22.3	--	--
May 30, '98	--	--	--	--	--	--	/	--	--	--
May 31, '98	--	--	--	--	--	--	/	--	--	--
June 1, '98	--	--	--	6/1/98 17:52	8870.5	1.5	/	72.4	--	--
June 2, '98	--	--	--	--	--	--	/	--	--	--
June 3, '98	--	--	--	6/3/98 16:45	8871.3	0.8	/	46.1	--	--
June 4, '98	6/4/98 8:00	2948787	1615	6/4/98 17:03	8871.8	0.5	/	23.8	0.2	2
<i>Monthly Downtime and Average Flow⁽¹⁾</i>							/	869.7	0.2	

Notes:

-- - not measured

(1) Average flow rate from April 30 to June 4.

TABLE 4

SUMMARY OF FLOW RATES AND OPERATING HOURS - EW-2
GROUNDWATER EXTRACTION SYSTEM
MALLORY CAPACITOR SITE
WAYNESBORO, TENNESSEE

<i>Date</i>	<i>Water Meter Reading Time</i>	<i>Water Meter Reading (total gallons)</i>	<i>Flow (gallons) Between Measurements</i>	<i>Pump Run Reading Time</i>	<i>Cumulative Operating Hours</i>	<i>Operating Hours Between Measurements/Downtime Between Measurements</i>			<i>Actual Flow Rate (gallons per minute)</i>	<i>Set Flow Rate</i>
April 30, '98	4/30/98 9:00	39158540	441301	4/30/98 16:57	3011.3	23.5	/	0.5	43.8	44
May 1, '98	--	--	--	5/1/98 15:07	3033.0	21.7	/	0.5	--	--
May 2, '98	--	--	--	--	--	--	/	--	--	--
May 3, '98	--	--	--	--	--	--	/	--	--	--
May 4, '98	5/4/98 9:00	39445145	286605	5/4/98 16:50	3105.7	72.7	/	1.0	49.8	44
May 5, '98	--	--	--	5/5/98 17:43	3130.6	24.9	/	0.0	--	--
May 6, '98	--	--	--	5/6/98 17:27	3154.3	23.7	/	0.0	--	--
May 7, '98	--	--	--	5/7/98 17:49	3178.7	24.4	/	0.0	--	--
May 8, '98	--	--	--	5/8/98 11:52	3196.8	18.1	/	0.0	--	--
May 9, '98	--	--	--	--	--	--	/	--	--	--
May 10, '98	--	--	--	--	--	--	/	--	--	--
May 11, '98	--	--	--	5/11/98 16:48	3273.2	76.4	/	24.7	--	--
May 12, '98	--	--	--	5/12/98 16:58	3296.7	23.5	/	0.7	--	--
May 13, '98	--	--	--	5/13/98 16:22	3320.1	23.4	/	0.0	--	--
May 14, '98	5/14/98	40050773	605628	5/14/98 16:15	3343.1	23.0	/	0.9	43.7	44
May 15, '98	--	--	--	5/15/98 16:16	3367.2	24.1	/	0.0	--	--
May 16, '98	--	--	--	--	--	--	/	--	--	--
May 17, '98	--	--	--	--	--	--	/	--	--	--
May 18, '98	--	--	--	--	--	--	/	--	--	--
May 19, '98	--	--	--	--	--	--	/	--	--	--
May 20, '98	--	--	--	--	--	--	/	--	--	--
May 21, '98	5/21/98 9:00	40464397	413624	--	--	--	/	--	38.9	44
May 22, '98	--	--	--	--	--	--	/	--	--	--
May 23, '98	--	--	--	--	--	--	/	--	--	--
May 24, '98	--	--	--	--	--	--	/	--	--	--
May 25, '98	--	--	--	--	--	--	/	--	--	--
May 26, '98	--	--	--	5/26/98 18:44	3632.5	265.3	/	1.2	--	--
May 27, '98	--	--	--	5/27/98 18:28	3655.0	22.5	/	1.2	--	--
May 28, '98	5/28/98 9:00	40873701	409304	5/28/98 17:15	3677.8	22.8	/	0.0	40.6	44
May 29, '98	--	--	--	5/29/98 15:56	3698.3	20.5	/	2.2	--	--
May 30, '98	--	--	--	--	--	--	/	--	--	--
May 31, '98	--	--	--	--	--	--	/	--	--	--
June 1, '98	--	--	--	6/1/98 17:52	3772.3	74.0	/	0.0	--	--
June 2, '98	--	--	--	--	--	--	/	--	--	--
June 3, '98	--	--	--	6/3/98 16:45	3816.8	44.5	/	2.4	--	--
June 4, '98	6/4/98 8:00	41285550	411849	6/4/98 17:03	3841.1	24.3	/	0.0	41.1	44
<i>Monthly Downtime and Average Flow⁽¹⁾</i>							/	35.2	42.3	

Notes:

-- - not measured

(1) Average flow rate from April 30 to June 4.

TABLE 5

SUMMARY OF FLOW RATES AND OPERATING HOURS - EW-3
GROUNDWATER EXTRACTION SYSTEM
MALLORY CAPACITOR SITE
WAYNESBORO, TENNESSEE

<i>Date</i>	<i>Water Meter Reading Time</i>	<i>Water Meter Reading (total gallons)</i>	<i>Flow (gallons) Between Measurements</i>	<i>Pump Run Reading Time</i>	<i>Cumulative Operating Hours</i>	<i>Operating Hours Between Measurements/Downtime Between Measurements</i>			<i>Actual Flow Rate (gallons per minute)</i>	<i>Set Flow Rate</i>
April 30, '98	4/30/98 9:00	9167676	53519	4/30/98 16:57	15602.7	7.7	/	16.3	5.3	7
May 1, '98	--	--	--	5/1/98 15:07	15610.2	7.5	/	14.7	--	--
May 2, '98	--	--	--	--	--	--	/	--	--	--
May 3, '98	--	--	--	--	--	--	/	--	--	--
May 4, '98	5/4/98 9:00	9200771	33095	5/4/98 16:50	15636.3	26.1	/	47.6	5.7	7
May 5, '98	--	--	--	5/5/98 17:43	15644.4	8.1	/	16.8	--	--
May 6, '98	--	--	--	5/6/98 17:27	15652.1	7.7	/	16.0	--	--
May 7, '98	--	--	--	5/7/98 17:49	15660.0	7.9	/	16.5	--	--
May 8, '98	--	--	--	5/8/98 11:52	15666.1	6.1	/	11.9	--	--
May 9, '98	--	--	--	--	--	--	/	--	--	--
May 10, '98	--	--	--	--	--	--	/	--	--	--
May 11, '98	--	--	--	5/11/98 16:48	15692.5	26.4	/	74.7	--	--
May 12, '98	--	--	--	5/12/98 16:58	15701.4	8.9	/	15.3	--	--
May 13, '98	--	--	--	5/13/98 16:22	15709.2	7.8	/	15.6	--	--
May 14, '98	5/14/98	9273128	72357	5/14/98 16:15	15717.0	7.8	/	16.1	5.2	7
May 15, '98	--	--	--	5/15/98 16:16	15725.1	8.1	/	15.9	--	--
May 16, '98	--	--	--	--	--	--	/	--	--	--
May 17, '98	--	--	--	--	--	--	/	--	--	--
May 18, '98	--	--	--	--	--	--	/	--	--	--
May 19, '98	--	--	--	--	--	--	/	--	--	--
May 20, '98	--	--	--	--	--	--	/	--	--	--
May 21, '98	5/21/98 9:00	9322433	49305	--	--	--	/	--	4.6	7
May 22, '98	--	--	--	--	--	--	/	--	--	--
May 23, '98	--	--	--	--	--	--	/	--	--	--
May 24, '98	--	--	--	--	--	--	/	--	--	--
May 25, '98	--	--	--	--	--	--	/	--	--	--
May 26, '98	--	--	--	5/26/98 18:44	15875.6	150.5	/	116.0	--	--
May 27, '98	--	--	--	5/27/98 18:28	15893.5	17.9	/	5.8	--	--
May 28, '98	5/28/98 9:00	9373219	50786	5/28/98 17:15	15900.1	6.6	/	16.2	5.0	7
May 29, '98	--	--	--	5/29/98 15:56	15906.2	6.1	/	16.6	--	--
May 30, '98	--	--	--	--	--	--	/	--	--	--
May 31, '98	--	--	--	--	--	--	/	--	--	--
June 1, '98	--	--	--	6/1/98 17:52	15928.6	22.4	/	51.5	--	--
June 2, '98	--	--	--	--	--	--	/	--	--	--
June 3, '98	--	--	--	6/3/98 16:45	15941.7	13.1	/	33.8	--	--
June 4, '98	6/4/98 8:00	9617023	243804	6/4/98 17:03	15948.3	6.6	/	17.7	24.3	7
<i>Monthly Downtime and Average Flow⁽¹⁾</i>						/			535.0	8.9

Notes:

-- - not measured

(1) Average flow rate from April 30 to June 4.

TABLE 6

SUMMARY OF FLOW RATES AND OPERATING HOURS - EW-4
GROUNDWATER EXTRACTION SYSTEM
MALLORY CAPACITOR SITE
WAYNESBORO, TENNESSEE

<i>Date</i>	<i>Water Meter Reading Time</i>	<i>Water Meter Reading (total gallons)</i>	<i>Flow (gallons) Between Measurements</i>	<i>Pump Run Reading Time</i>	<i>Cumulative Operating Hours</i>	<i>Operating Hours Between Measurements/Downtime Between Measurements</i>			<i>Actual Flow Rate (gallons per minute)</i>	<i>Set Flow Rate</i>
April 30, '98	4/30/98 9:00	2430282	1583	4/30/98 16:57	9768.3	1.2	/	22.8	0.2	4
May 1, '98	--	--	--	5/1/98 15:07	9769.5	1.2	/	21.0	--	--
May 2, '98	--	--	--	--	--	--	/	--	--	--
May 3, '98	--	--	--	--	--	--	/	--	--	--
May 4, '98	5/4/98 9:00	2431294	1012	5/4/98 16:50	9773.0	3.5	/	70.2	0.2	4
May 5, '98	--	--	--	5/5/98 17:43	9774.0	1.0	/	23.9	--	--
May 6, '98	--	--	--	5/6/98 17:27	9775.1	1.1	/	22.6	--	--
May 7, '98	--	--	--	5/7/98 17:49	9776.1	1.0	/	23.4	--	--
May 8, '98	--	--	--	5/8/98 11:52	9776.9	0.8	/	17.2	--	--
May 9, '98	--	--	--	--	--	--	/	--	--	--
May 10, '98	--	--	--	--	--	--	/	--	--	--
May 11, '98	--	--	--	5/11/98 16:48	9780.2	3.3	/	97.8	--	--
May 12, '98	--	--	--	5/12/98 16:58	9781.1	0.9	/	23.3	--	--
May 13, '98	--	--	--	5/13/98 16:22	9782.1	1.0	/	22.4	--	--
May 14, '98	5/14/98	2433154	1860	5/14/98 16:15	9783.0	0.9	/	23.0	0.1	4
May 15, '98	--	--	--	5/15/98 16:16	9783.9	0.9	/	23.1	--	--
May 16, '98	--	--	--	--	--	--	/	--	--	--
May 17, '98	--	--	--	--	--	--	/	--	--	--
May 18, '98	--	--	--	--	--	--	/	--	--	--
May 19, '98	--	--	--	--	--	--	/	--	--	--
May 20, '98	--	--	--	--	--	--	/	--	--	--
May 21, '98	5/21/98 9:00	2434351	1197	--	--	--	/	--	0.1	4
May 22, '98	--	--	--	--	--	--	/	--	--	--
May 23, '98	--	--	--	--	--	--	/	--	--	--
May 24, '98	--	--	--	--	--	--	/	--	--	--
May 25, '98	--	--	--	--	--	--	/	--	--	--
May 26, '98	--	--	--	5/26/98 18:44	9792.8	8.9	/	257.6	--	--
May 27, '98	--	--	--	5/27/98 18:28	9793.5	0.7	/	23.0	--	--
May 28, '98	5/28/98 9:00	2435407	1056	5/28/98 17:15	9794.2	0.7	/	22.1	0.1	4
May 29, '98	--	--	--	5/29/98 15:56	9794.9	0.7	/	22.0	--	--
May 30, '98	--	--	--	--	--	--	/	--	--	--
May 31, '98	--	--	--	--	--	--	/	--	--	--
June 1, '98	--	--	--	6/1/98 17:52	9797.1	2.2	/	71.7	--	--
June 2, '98	--	--	--	--	--	--	/	--	--	--
June 3, '98	--	--	--	6/3/98 16:45	9798.4	1.3	/	45.6	--	--
June 4, '98	6/4/98 8:00	2436485	1078	6/4/98 17:03	9799.1	0.7	/	23.6	0.1	4
<i>Monthly Downtime and Average Flow⁽¹⁾</i>							/	856.3	0.1	

Notes:

-- - not measured

(1) Average flow rate from April 30 to June 4.

TABLE 6

SUMMARY OF FLOW RATES AND OPERATING HOURS - EW-4
GROUNDWATER EXTRACTION SYSTEM
MALLORY CAPACITOR SITE
WAYNESBORO, TENNESSEE

<i>Date</i>	<i>Water Meter Reading Time</i>	<i>Water Meter Reading (total gallons)</i>	<i>Flow (gallons) Between Measurements</i>	<i>Pump Run Reading Time</i>	<i>Cumulative Operating Hours</i>	<i>Operating Hours Between Measurements/Downtime Between Measurements</i>			<i>Actual Flow Rate (gallons per minute)</i>	<i>Set Flow Rate</i>
April 30, '98	4/30/98 9:00	2430282	1583	4/30/98 16:57	9768.3	1.2	/	22.8	0.2	4
May 1, '98	--	--	--	5/1/98 15:07	9769.5	1.2	/	21.0	--	--
May 2, '98	--	--	--	--	--	--	/	--	--	--
May 3, '98	--	--	--	--	--	--	/	--	--	--
May 4, '98	5/4/98 9:00	2431294	1012	5/4/98 16:50	9773.0	3.5	/	70.2	0.2	4
May 5, '98	--	--	--	5/5/98 17:43	9774.0	1.0	/	23.9	--	--
May 6, '98	--	--	--	5/6/98 17:27	9775.1	1.1	/	22.6	--	--
May 7, '98	--	--	--	5/7/98 17:49	9776.1	1.0	/	23.4	--	--
May 8, '98	--	--	--	5/8/98 11:52	9776.9	0.8	/	17.2	--	--
May 9, '98	--	--	--	--	--	--	/	--	--	--
May 10, '98	--	--	--	--	--	--	/	--	--	--
May 11, '98	--	--	--	5/11/98 16:48	9780.2	3.3	/	97.8	--	--
May 12, '98	--	--	--	5/12/98 16:58	9781.1	0.9	/	23.3	--	--
May 13, '98	--	--	--	5/13/98 16:22	9782.1	1.0	/	22.4	--	--
May 14, '98	5/14/98	2433154	1860	5/14/98 16:15	9783.0	0.9	/	23.0	0.1	4
May 15, '98	--	--	--	5/15/98 16:16	9783.9	0.9	/	23.1	--	--
May 16, '98	--	--	--	--	--	--	/	--	--	--
May 17, '98	--	--	--	--	--	--	/	--	--	--
May 18, '98	--	--	--	--	--	--	/	--	--	--
May 19, '98	--	--	--	--	--	--	/	--	--	--
May 20, '98	--	--	--	--	--	--	/	--	--	--
May 21, '98	5/21/98 9:00	2434351	1197	--	--	--	/	--	0.1	4
May 22, '98	--	--	--	--	--	--	/	--	--	--
May 23, '98	--	--	--	--	--	--	/	--	--	--
May 24, '98	--	--	--	--	--	--	/	--	--	--
May 25, '98	--	--	--	--	--	--	/	--	--	--
May 26, '98	--	--	--	5/26/98 18:44	9692.8	8.9	/	257.6	--	--
May 27, '98	--	--	--	5/27/98 18:28	9793.5	0.7	/	23.0	--	--
May 28, '98	5/28/98 9:00	2435407	1056	5/28/98 17:15	9794.2	0.7	/	22.1	0.1	4
May 29, '98	--	--	--	5/29/98 15:56	9794.9	0.7	/	22.0	--	--
May 30, '98	--	--	--	--	--	--	/	--	--	--
May 31, '98	--	--	--	--	--	--	/	--	--	--
June 1, '98	--	--	--	6/1/98 17:52	9797.1	2.2	/	71.7	--	--
June 2, '98	--	--	--	--	--	--	/	--	--	--
June 3, '98	--	--	--	6/3/98 16:45	9798.4	1.3	/	45.6	--	--
June 4, '98	6/4/98 8:00	2436485	1078	6/4/98 17:03	9799.1	0.7	/	23.6	0.1	4
<i>Monthly Downtime and Average Flow⁽¹⁾</i>							/	856.3	0.1	

Notes:

-- - not measured

(1) Average flow rate from April 30 to June 4.

TABLE 7

SUMMARY OF FLOW RATES AND OPERATING HOURS - EW-5
GROUNDWATER EXTRACTION SYSTEM
MALLORY CAPACITOR SITE
WAYNESBORO, TENNESSEE

<i>Date</i>	<i>Water Meter Reading Time</i>	<i>Water Meter Reading (total gallons)</i>	<i>Flow (gallons) Between Measurements</i>	<i>Pump Run Reading Time</i>	<i>Cumulative Operating Hours</i>	<i>Operating Hours Between Measurements/Downtime Between Measurements</i>			<i>Actual Flow Rate (gallons per minute)</i>	<i>Set Flow Rate</i>
April 30, '98	4/30/98 9:00	4697977	47220	4/30/98 16:57	12375.2	23.5	/	0.5	4.7	7
May 1, '98	--	--	--	5/1/98 15:07	12397.2	22.0	/	0.2	--	--
May 2, '98	--	--	--	--	--	--	/	--	--	--
May 3, '98	--	--	--	--	--	--	/	--	--	--
May 4, '98	5/4/98 9:00	4727724	29747	5/4/98 16:50	12469.6	72.4	/	1.3	5.2	7
May 5, '98	--	--	--	5/5/98 17:43	12494.5	24.9	/	0.0	--	--
May 6, '98	--	--	--	5/6/98 17:27	12518.2	23.7	/	0.0	--	--
May 7, '98	--	--	--	5/7/98 17:49	12542.6	24.4	/	0.0	--	--
May 8, '98	--	--	--	5/8/98 11:52	12560.6	18.0	/	0.0	--	--
May 9, '98	--	--	--	--	--	--	/	--	--	--
May 10, '98	--	--	--	--	--	--	/	--	--	--
May 11, '98	--	--	--	5/11/98 16:48	12637.1	76.5	/	24.6	--	--
May 12, '98	--	--	--	5/12/98 16:58	12660.6	23.5	/	0.7	--	--
May 13, '98	--	--	--	5/13/98 16:22	12684.0	23.4	/	0.0	--	--
May 14, '98	5/14/98	4794109	66385	5/14/98 16:15	12707.0	23.0	/	0.9	4.8	7
May 15, '98	--	--	--	5/15/98 16:16	12731.0	24.0	/	0.0	--	--
May 16, '98	--	--	--	--	--	--	/	--	--	--
May 17, '98	--	--	--	--	--	--	/	--	--	--
May 18, '98	--	--	--	--	--	--	/	--	--	--
May 19, '98	--	--	--	--	--	--	/	--	--	--
May 20, '98	--	--	--	--	--	--	/	--	--	--
May 21, '98	5/21/98 9:00	4842533	48424	--	--	--	/	--	4.6	7
May 22, '98	--	--	--	--	--	--	/	--	--	--
May 23, '98	--	--	--	--	--	--	/	--	--	--
May 24, '98	--	--	--	--	--	--	/	--	--	--
May 25, '98	--	--	--	--	--	--	/	--	--	--
May 26, '98	--	--	--	5/26/98 18:44	12996.6	265.6	/	0.9	--	--
May 27, '98	--	--	--	5/27/98 18:28	13018.8	22.2	/	1.5	--	--
May 28, '98	5/28/98 9:00	4891810	49277	5/28/98 17:15	13041.6	22.8	/	0.0	4.9	7
May 29, '98	--	--	--	5/29/98 15:56	13062.1	20.5	/	2.2	--	--
May 30, '98	--	--	--	--	--	--	/	--	--	--
May 31, '98	--	--	--	--	--	--	/	--	--	--
June 1, '98	--	--	--	6/1/98 17:52	13136.0	73.9	/	0.0	--	--
June 2, '98	--	--	--	--	--	--	/	--	--	--
June 3, '98	--	--	--	6/3/98 16:45	13164.1	28.1	/	18.8	--	--
June 4, '98	6/4/98 8:00	4929338	37528	6/4/98 17:03	13188.4	24.3	/	0.0	3.7	7
<i>Monthly Downtime and Average Flow⁽¹⁾</i>							/	51.6	4.6	

Notes:

-- - not measured

(1) Average flow rate from April 30 to June 4.

TABLE 8

SUMMARY OF ANALYTICAL DATA - TREATED WATER DISCHARGE
MALLORY CAPACITOR CO. SITE
WAYNESBORO, TENNESSEE

<i>Sample Date</i>	<i>Sample ID</i>	<i>Concentration ($\mu\text{g/L}$)</i>				<i>Vinyl Chloride</i>	<i>Conductivity ($\mu\text{S/cm}$)</i>	<i>pH</i>	<i>Temperature ($^{\circ}\text{C}$)</i>
		<i>PCBs</i>	<i>TCE</i>	<i>cis-1,2-DCE</i>	<i>trans-1,2-DCE</i>				
May 4, 1998	EW-050498-AP-957	ND (0.5) ⁽¹⁾ UJ ⁽²⁾	ND (1.0)	1.9 ⁽³⁾	ND (1.0)	ND (1.0)	274	8.33	20.3

Notes:

(1) ND - Not detected at the reporting limit indicated in parentheses.

(2) UJ - The associated quantitation limit is an estimated value.

(3) The continuous discharge limit for 1,2-DCE is 303 $\mu\text{g/L}$ as stipulated in the Order.

TABLE 9

SUMMARY OF ANALYTICAL DATA - TREATMENT SYSTEM COMPONENT EVALUATION
MALLORY CAPACITOR CO. SITE
WAYNESBORO, TENNESSEE

Date/Location	Sample ID	Concentration (mg/L)				Concentration (µg/L)					Conduct (µS/cm)	pH	Temp. (°C)
		Calcium	Magnesium	Iron	TSS	PCBs	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride			
May 4, 1998													
Between carbon adsorbers	IW-050498-AP-956	-- ^[1]	--	--	--	ND ^[2] (0.5) UJ ^[3]	ND(1.0)	ND(1.0)	1.8	ND(1.0)	265	8.16	20.3
Between resin filters	IW-050498-AP-955	--	--	--	--	ND (0.5) UJ	--	--	--	--	195	8.29	22.1

Notes:

[1] "--" - Not sampled.

[2] ND - Not detected at the reporting limit indicated in parentheses.

[3] UJ - The associated quantitation limit is an estimated value.

TABLE 10

WATER LEVEL ELEVATION SUMMARY
MALLORY CAPACITOR CO. SITE
WAYNESBORO, TENNESSEE

Monitoring Well	Reference Elevation	Water Level Measurements (ft AMSL)
		May 4, 1998
Shallow Bedrock Groundwater Monitoring Wells		
OW11-85	715.69	704.05
OW12-85	716.53	698.67
OW13-85	715.20	703.80
OW19-85	713.60	706.18
OW21-86	710.44	705.38
OW23-86	707.16	705.96
OW25-89	716.25	701.49
OW27-89	716.70	699.38
OW29-89	719.06	700.40
OW31-89	719.68	704.50
OW33-89	721.66	706.30
OW35-89	725.80	717.18
OW37-89	721.36	701.70
OW39-89	734.04	715.96
OW41-89	724.08	702.44
OW43-89	737.18	716.94
OW45-89	731.52	716.94
OW47-89	722.44	711.44
OW48-89	722.14	703.82
OW49-89	723.84	705.08
OW50-89	722.44	704.18
OW55-90	746.16	729.44
OW58-90	711.47	692.01
OW59-90	710.45	694.29
OW61-90	732.80	717.18
OW64-92	718.72	687.76
OW65-92	706.93	699.79
OW66-95 (1)	716.62	698.18
OW67-95 (1)	717.79	703.25
Deep Bedrock Groundwater Monitoring Wells		
OW14-85	717.10	693.40
OW24-89	709.62	701.60
OW26-89	716.20	691.04
OW28-89	716.36	688.58
OW30-89	719.24	697.72
OW32-89	719.44	707.52
OW34-89	722.02	701.20
OW36-89	725.78	713.74
OW38-89	721.48	680.80
OW40-89	734.18	684.38
OW42-89	723.70	695.74
OW44-89	736.86	696.64

TABLE 10

WATER LEVEL ELEVATION SUMMARY
MALLORY CAPACITOR CO. SITE
WAYNESBORO, TENNESSEE

Monitoring Well	Reference Elevation	Water Level Measurements (ft AMSL)	
		May 4, 1998	
OW46-89	731.16		722.42
OW52-89	716.30		705.40
OW56-90	746.16		715.96
OW57-90	711.35		701.71
OW60-90	707.95		701.77
Deeper Bedrock Groundwater Monitoring Wells			
OW62-90	718.31		702.11
OW63-90	723.65		702.13
Bedrock Groundwater Extraction Wells (2)			
EW-1	723.00		636.48
EW-2	720.51		656.27
EW-3	724.37		661.67
EW-4	722.58		637.54
EW-5	721.36		674.08
Surface Water			
Green River	713.71		711.97

Notes:

- (1) OW66-95 and OW67-95 are piezometers.
 (2) Groundwater extraction well pump depth elevations were set as follows:
 NM - Not measured

Extraction Well	Pump Depth Setting (ft AMSL)			
	Prior to September 4, 1996	September 4, 1996	September 24, 1996	
EW-1	633	639	639	
EW-2	630	645	651	
EW-3	635	641	641	
EW-4	635	639	639	
EW-5	632	638	638	
	<i>November 19, 1996</i>	<i>February 11, 1997</i>	<i>February 20, 1997</i>	<i>September 15, 1997</i>
EW-1	639	639	628	632
EW-2	650	654	654	654
EW-3	641	641	641	641
EW-4	639	639	629	632
EW-5	648	638	638	648

TABLE 11

SUMMARY OF MAY 1998 ANALYTICAL DATA - EXTRACTION WELLS
MALLORY CAPACITOR CO. SITE
WAYNESBORO, TENNESSEE

Date/Location	Sample ID	Concentration (μg/L)					Conductivity (μS/cm)	pH	Temperature (°C)
		PCBs	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride			
May 4, 1998									
EW-1	IW-050498-AP-954	11 J ^[1]	5,000	440	ND (200)	ND (200)	290	8.19	21.9
EW-2	IW-050498-AP-950/951	64 J/46 J	4,900/4,700	1,600/1,600	ND (200)/ND (200)	ND (200)/ND (200)	318	8.20	21.4
EW-3	IW-050498-AP-949	300 J	7,800	1,300	ND (500)	ND (500)	407	8.68	22.4
EW-4	IW-050498-AP-953	4,100 J	19,000	2,100	ND (500)	ND (500)	570	7.64	22.5
EW-5	IW-050498-AP-952	86 J	810	270	ND (25)	ND (25)	180	8.17	20.9

Notes:

^[1] J - This result is an estimated value.

^[2] ND - Not detected at the reporting limit indicated in parentheses.